# Advantages of an automated approach

**Rising emphasis on productivity and safety in companies, particularly during crisis, has resulted in the need for an approach that could reduce energy consumption and enhance return on investment. Manufacturers, therefore, need to automate their processes and operations to attain these objectives as well as enhance productivity and profitability.**

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Typically, during a downturn, most processing companies tend to shift their priorities away from maximising throughput to minimising waste and reducing energy consumption as a means to increase return on investment. This change in focus thus leads to a stronger emphasis on the safety parameter.

The experience of several polymer production plants is a case in point. In these plants, in particular, as also in other specialty chemicals facilities, processes are constantly changing, as they run on a fixed set of operating conditions. Companies continuously produce various products with different densities, viscosities and material properties.

One of the key environmental challenges that organisations face is that each grade transition produces many tonnes of off-specification material. It is frequently difficult, or even impossible, to sell these intermediate grade products at a premium rate. While blending and recycling techniques are available in this eventuality, which are more environment-friendly, these cost energy and such products thus manufactured will probably invariably have to be dumped into landfills. There are associated safety implications as well. Carrying out a transition from one product grade to another is one of the most safety-critical operations in a chemical plant.

## A harmonised approach

Until recently, no commercially available technologies were available to support automation and optimisation of product grade transitions. Minimising the waste created by the transition from one grade to another is something that Advanced Process Control (APC) can now help with, thanks to the innovative use of non-linear as opposed to linear control and advancements in procedural automation technology.

Nevertheless, it is not only the development of the process that is important here, but equally important is orchestration of the functions of the controller and having a technology that can coordinate and provide synchronised sequencing logic to some of the manual processes in the plant. For instance, AspenTech's clients have witnessed considerable success in this area. We have been able to achieve an average of 50 per cent reduction in transition waste for them, with some clients significantly exceeding this value.

This is a relatively recent but hugely significant breakthrough. Handing over the product grade transition process to an automated controller has never been taken lightly by operators who have historically not been fully convinced of the safety credentials of automated processes. Therefore, for many years, while APC was being widely deployed across ethylene and refining plants, it was not extensively used in the polymer industry. Since the collaboration was complex between what the automated controller needed to do and what operators were required to do, both on the plant and in the control room, it was not deemed safe to use the APC

technology. For instance, AspenTech has managed to tackle such problems by using a combination of sequencing technology and non-linear control.

Over the past few years, the use of this method has become an expectation with companies in the sector. If a polymer company requires an advanced process control, then it expects the solution to optimise its product grade transitions. Polymer companies have moved on from being concerned only about the safety of handing over a process to a remote controller towards a situation where they recognise this as the right approach.

## Working in tandem

This paradigm shift has been driven by polymer companies themselves. In the earliest days of APC, vendors have tried to push a certain technology as being a solution rather than listening to their customers' requirements.

For example, they initially tried to promote the standard version of APC, though it did not work. Later, they shifted their focus to consider the viability of neural networks as a potential solution. Again, the sales pitch was unsuccessful, primarily because the ability of this technology to deliver precise predictions about product grade transitions can often be unreliable.

Ultimately, vendors realised that the best approach was to work painstakingly with polymer companies in order to develop safe as well as reliable modelling and controller technology that closely fitted their business objectives of reducing waste not just in transitions, but also during in-grade product runs. Being able to manage this process has further environmental benefits because the 'off-spec waste' created by the latter process would either have to be reprocessed, with all attendant energy implications, or scrapped. The key was to gain knowledge and proofs of concepts and ensure that business needs were driving the technology development rather than vice versa.

## Futuristic solutions

This meticulous approach has ultimately borne fruit. Polymer companies today no longer have to be concerned about environmental and safety issues surrounding product grade transitions. They can now be confident about the resolution of the problems. Moreover, manual techniques combined with high-quality sequencing technology and non-linear controls have provided them with the solution that they have been seeking for many years. ■

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